**Electrochemistry Unit Minds On Activity: Teacher’s Notes**

**Brainstorming of Key Ideas using Questions 1 and 2**

**Question1: How do batteries work?**

Use the PowerPoint slides to help students use their prior knowledge (brainstorm) to understand that batteries produce electrical energy using the chemical energy stored in them.

**Question2: What kind of chemical reaction takes place in batteries which produces electrical energy?**

Note: Concept Attainment model is used here.

1. Give (one by one) five examples and non-examples of the type of reactions that occurs in batteries. (The next page and the PowerPoint slides provide the list of examples/ non-examples used.)
2. Ask students to examine the provided examples and non-examples to determine the characteristics of the reactions that occur in batteries. Also provide the following hint to students:  
   *Hint: Observe what happens to the reactants in terms of electron transfer (exchange of electrons).*
3. Provide four testers (as provided on the next page and in the PowerPoint slides) to students in order to assess their understanding.
4. Introduce the concept of redox reactions to students as shown in the PowerPoint presentation.

**Examples/ Non-examples**

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| --- | --- |
| **Examples** | **Non-examples** |
| Zn(s) + CuSO4(aq) 🡪 Cu(s) + ZnSO4(aq) | CuSO4(aq) + 2NaOH(aq) 🡪 Cu(OH)2(aq) +Na2SO4(aq) |
| Cu(s) + 2AgNO3(aq) 🡪 Cu(NO3)2(aq) + 2Ag(s) | HCl(aq) + NaOH(aq) **→** NaCl(aq) + H2O(l) |
| Sn(s) + PbCl2(aq) 🡪 SnCl2(aq) + Pb(s) | AgNO3 (aq) + NaCl (aq) **→** AgCl (s) + NaNO3 (aq) |
| S(s) + HNO3(aq) 🡪 SO2(g) + NO(g) + H2O(l) | Na2CO3(aq) + 2HCl(aq) 🡪 CO2(g) + H2O(l) + 2NaCl(aq) |
| H2(g) + O2(g) 🡪 2H2O (l) | BaCl2(aq) + K2CrO4(aq) 🡪 BaCrO4(aq) + 2KCl(aq) |

**Testers**Which of the following is an example of the type of chemical reaction that occurs in batteries and which one of them is not?

1. 2NaCl(aq) 🡪 2Na(l) + Cl2(aq)
2. 2Al(s) + Fe2O3(s) 🡪 Al2O3(s) + 2Fe(s)
3. Ni(OH)2(s) + H2SO4(aq) **→** NiSO4(aq) + 2H2O(l)
4. Zn(s) + HgO(s) 🡪 ZnO(s) + Hg(l)

**Answers of Testers:**

1, 2 and 4 are examples of reactions that take place in batteries because exchange of electrons (change in charges of reactants) take place in them.   
3 is not an example because no exchange of electrons take place.